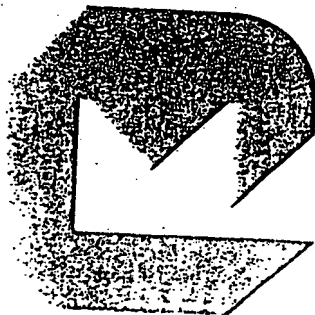
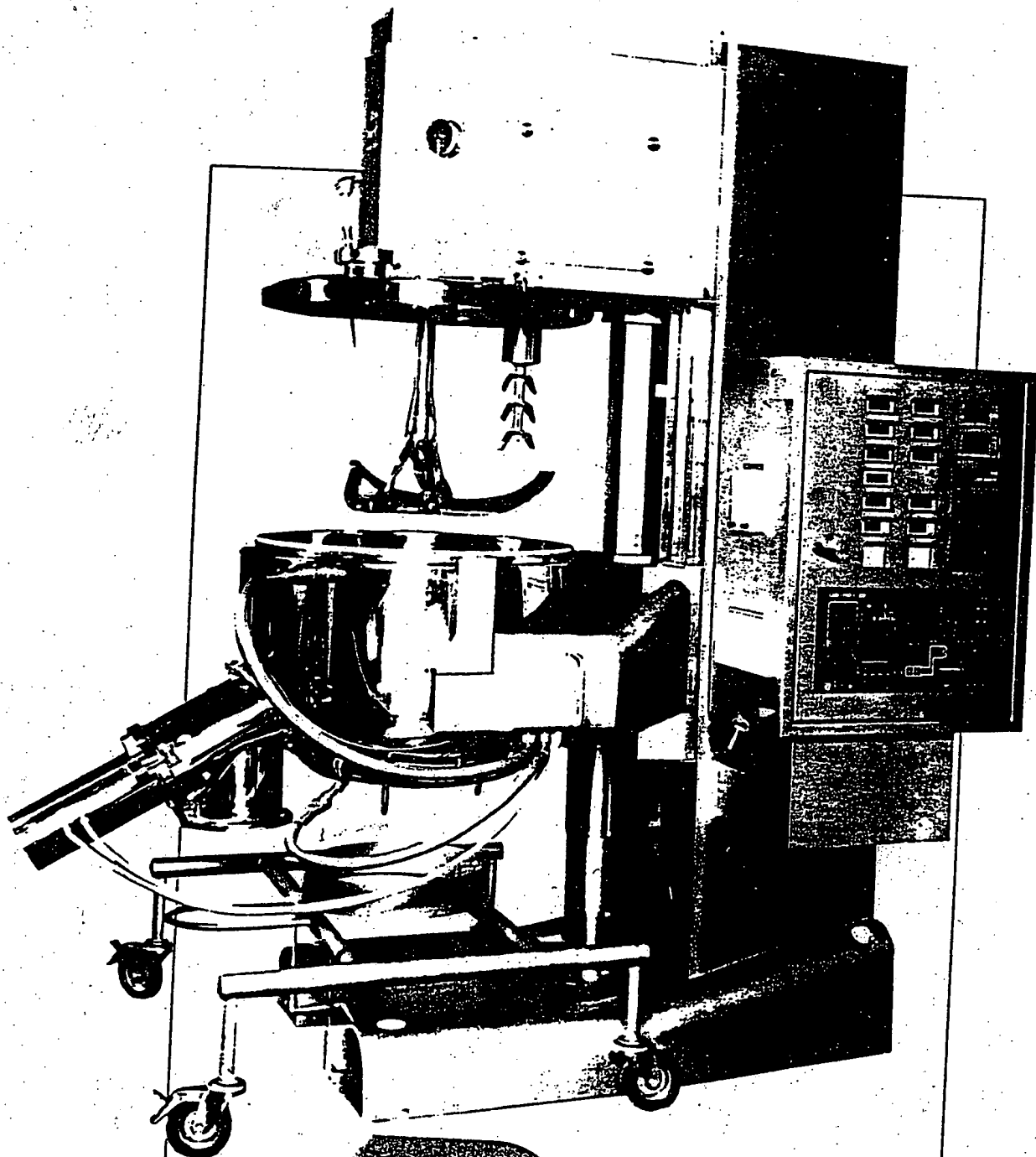


GRAL HIGH SHEAR MIXER GRANULATORS



MACHINES

collette

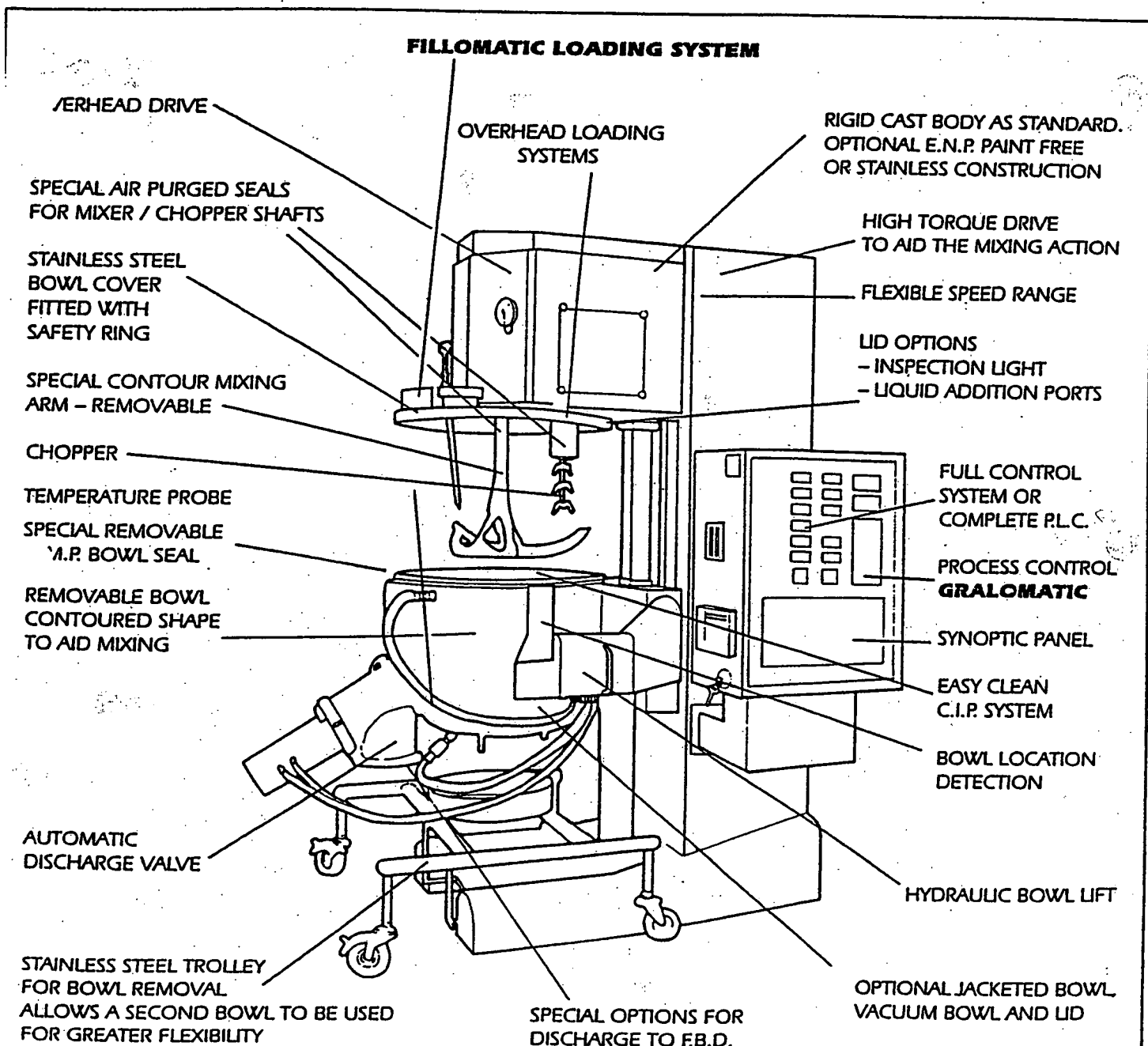


A member of the GEL International Group

The wet granulation process plays an important role in the production of solid pharmaceuticals. The properties of the granules have a great impact on the quality of the dosage forms, making the agglomeration process a key part of the operation. The wet agglomeration process has until recent years been a time-consuming and labour intensive process.

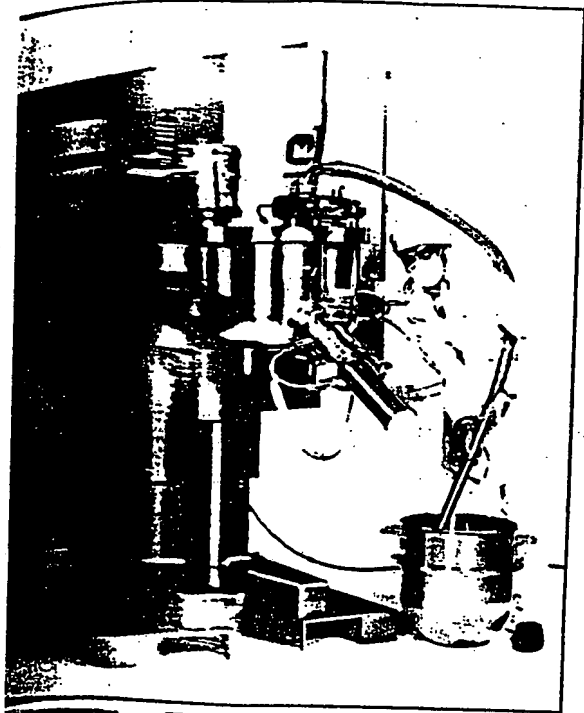
With the introduction of the Collette GRAL range, together with its unique concept, you can now consider equipment which will not only save time and production cost but will give you process control which will show benefits right through to the finished product. The range of Collette machines extend from the Standard GRAL right through to the PROCESSOR and VACTRON systems. All have the unique features which have been developed in partnership with some of the leading companies in the world's pharmaceutical and process industry.

Examine the features of the GRAL system.



**THE ONLY DESIGN THAT CAN GIVE YOU PERFECT G.M.P.
EASY VALIDATION AND THE MINIMUM OF CLEAN DOWN TIME**

In order that product should be contained during the process, it is necessary to consider the **FILLOMATIC SYSTEM**



GRAND CONTAINER WITH THE FILLOMATIC

1. The mixing bowl

The mixing bowl, lid and seals are reinforced to sustain vacuum. The FILLOMATIC system uses the bowl of the GRAL Mixer/Granulator as the vacuum chamber, the bowl is placed under vacuum at which point the vacuum is used to draw the ingredients into the bowl. As the machine has to sustain this vacuum, all necessary precautions have been taken with the design. For this reason all seals for the bowl and lid together with those for the air purged mixing shaft and chopper assembly are of a special design for vacuum operation.

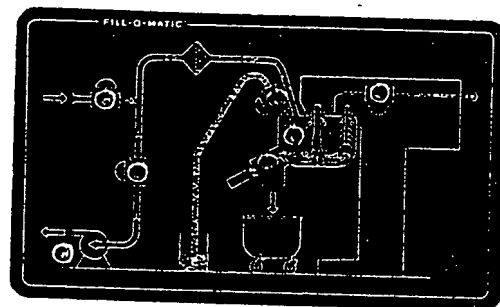
2. The vacuum pump.

To create the vacuum, the FILLOMATIC system incorporates its own vacuum pump and controls and is capable of maintaining the required level of vacuum for the bowl to be loaded in the minimum of time.

3. A filter to protect the vacuum pump.

In order that the vacuum pump is protected and to avoid product loss the FILLOMATIC system has its own filter system as standard, housed in the lid of the machine.

The filter has a large surface area to reduce the risk of clogging, it is made of a teflon coated material which helps this fact and also makes the back flush system very efficient. The filter can easily be replaced; access to the housing and general assembly allows easy cleaning.



SYNOPTIC PANEL

FILLOMATIC VACUUM DRAWING SYSTEM FOR -FREE OPERATION



... steel Tri-clover
... are fitted for easy
removal for cleaning and
... during production.

4. The suction hose.

The FILLOMATIC comes complete with a suction hose manufactured from P.V.C. which incorporates a conductive strap to avoid the build up of static electricity.

The hose is connected to the inlet valve on top of the bowl lid and used to draw the material from the container into the bowl. The hose is held by the operator or can be connected to a purpose designed material container or integrated with a Bulk Loading System housed on another floor.

5. Back Flush System.

The FILLOMATIC system has as standard its own back flush system designed to keep the filter clean and to reduce product loss by returning all material to the bowl. This system is fully automatic; the flushing process starts when the system detects that the filter is clogged.

6. The Valve Train.

The FILLOMATIC system incorporates a valve train which guarantees that the system works to a selected procedure interlinking each operation safely and elegantly.

7. Control Panel.

The FILLOMATIC system has as standard a purpose designed control panel with synoptic indication, showing very clearly all the manual and automatic functions of the FILLOMATIC. An L.E.D. display shows exactly which part of the cycle the system has reached and warning signals are incorporated for overpressure in the bowl and other parameters of which the operator should be aware.

8. To aid cleaning

Last but not least the FILLOMATIC can be used to draw in the water for washing the bowl for the final clean down. With the easy cleaning procedure of the GRAL, downtime is minimal.

CONTROLLED DISCHARGE

The GRAL has incorporated in the bowl a mechanically-operated discharge valve. Due to the unique feature of the GRAL having an elevated mixing position a FLUID BED DRYER bowl can be positioned directly beneath the valve for discharge. To aid discharge a lower speed can be fitted to the mixer drive incorporating a timer system so that the action may be jogged to enable the discharge to be balanced to suit the throughput of a comminuting mill or similar piece of equipment.

G.M.P. AND VALIDATION

All aspects of the machine have been designed to comply with G.M.P. The basic concept of having an overhead drive for both the MIXING ARM and CHOPPER ASSEMBLY guarantees that no seals or bearing assemblies are within the MIXING BOWL. As an added back-up all overhead seals are purged with compressed air and the covers of the seal assembly are easily removed for cleaning and validation. All contact parts in the area of the product are manufactured in AISI 316 and, dependant upon the specification you finally choose, every item of the machine is designed in such a way that it is easy to clean and service.

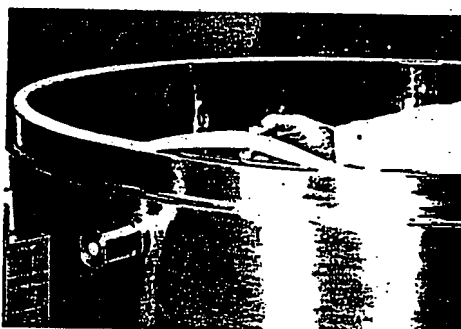
The MIXING BOWL is finished to an exceptionally high standard and is easily cleaned. Thought has been given to the BOWL SEAL which can be easily removed, cleaned and replaced between each batch. The MIXING ARM and CHOPPER ASSEMBLY can be removed easily for cleaning and validation - overall there is a minimum of downtime.



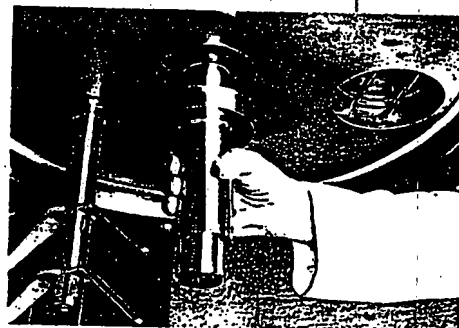
DISCHARGE VALVE



BOWL - MIXING ARM/CHOPPER



REMOVABLE BOWL SEAL



INSPECTION OF SEALS

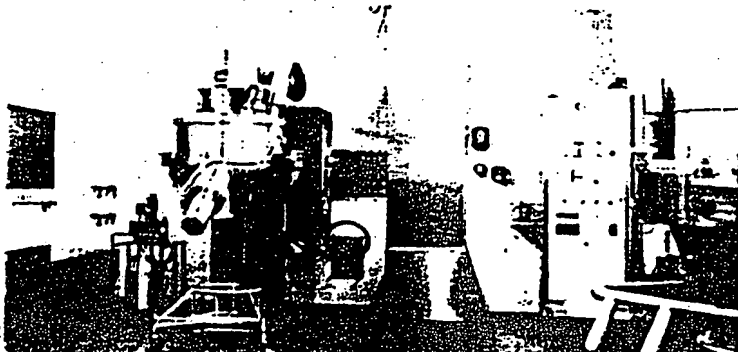
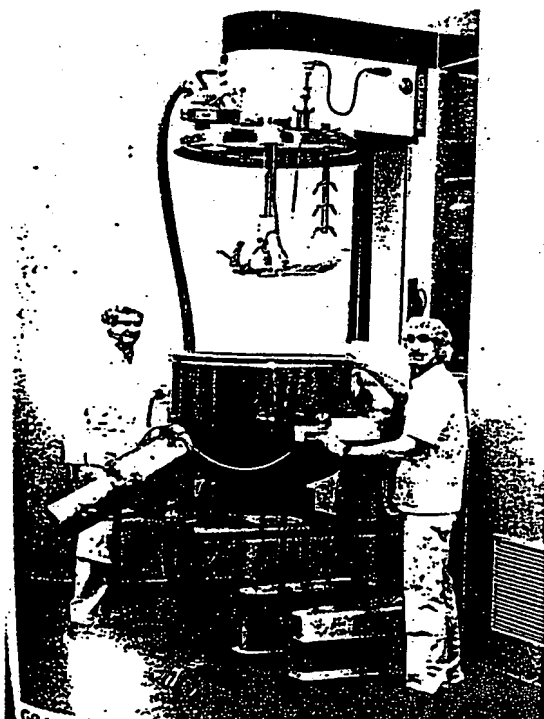
INSTALLATION & LAYOUT

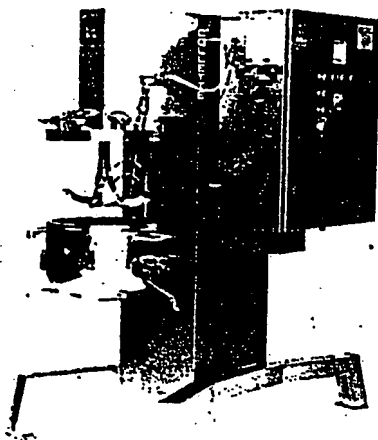
Collette have worked with a number of companies to work towards the best layout for both G.M.P. and production efficiency.

Any GRAL machine can be mounted into the wall of the granulation suite so that a clean line is maintained within the room - the rear of the machine extends into the service room adjacent.

Perfect G.M.P. All motors and utility items out of the product area.

A GRAL can be directly linked to a fluid bed drier - by re-positioning the valve of the GRAL so that it discharges straight into the F.B.D. installed alongside in a completely dust-free transfer - all controls are linked in a common panel.

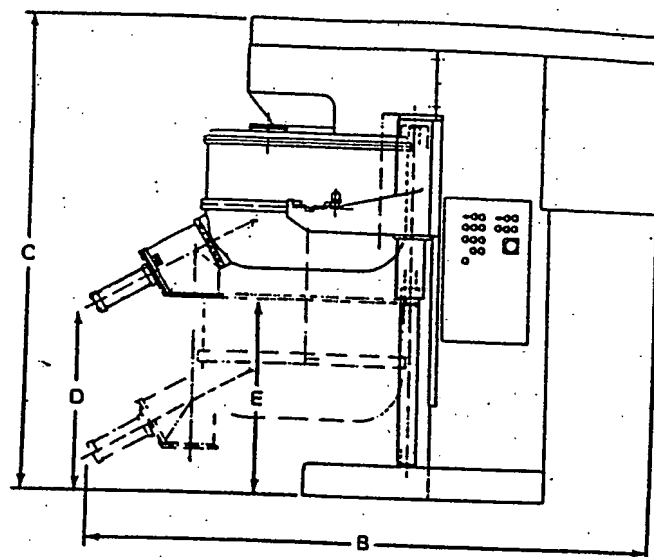
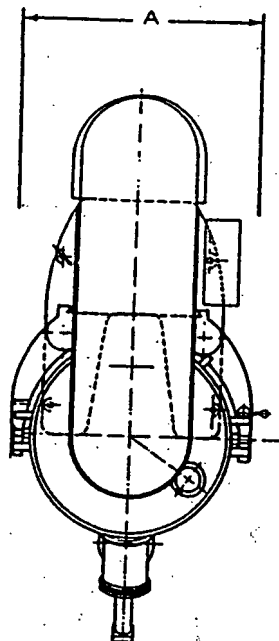
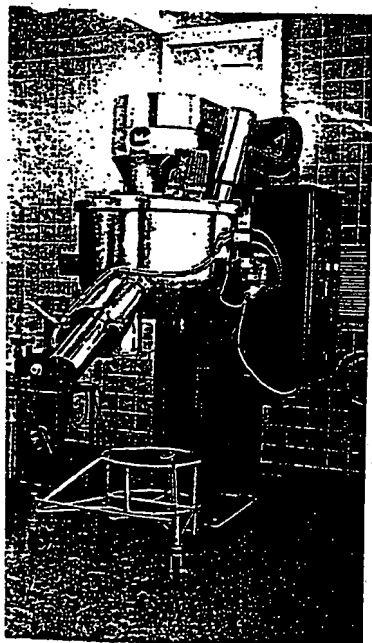




LABORATORY

Follow through from R & D laboratory size machine, to a production scale unit - exactly prepared to suit your specification from the complete range of optional equipment available.

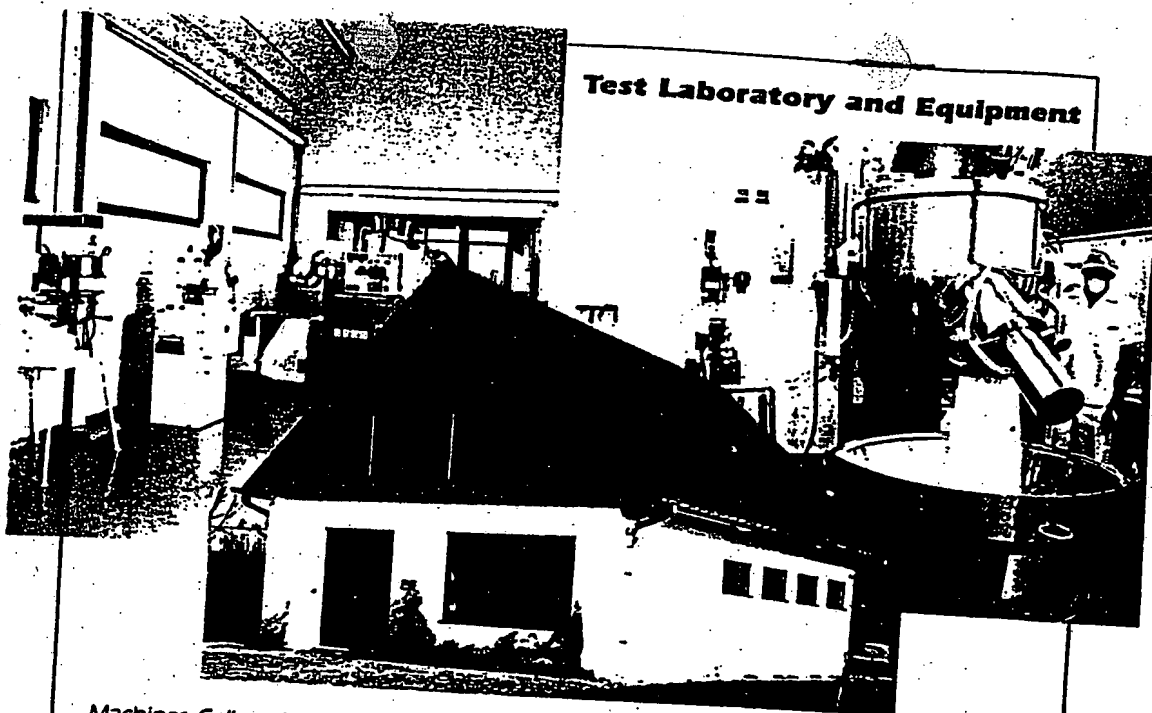
PRODUCTION



Model	10	25	75	150	300	400	600	1200
Max. bowl cap. (l)	7	25	75	150	300	400	600	1200
Working bowl cap. (approx litres)	4.5	17	50	100	200	267	400	800
Mixing arm RPM	430/660	295/440	203/306	150/230	125/190	103/155	95/140	75/115
Chopper RPM	1500/3000	1500/3000	1500/3000	1500/3000	1500/3000	1500/3000	1300/2600	1200/2400
Mixer motor kw	0.6/1.1	2.2/3	4/6	7.5/11	12/18	15/22	37	55
Chopper motor kw	0.6/0.8	1.4/1.8	2.2/3	3/4	6/7.5	6/7.5	5.5/7.5	9.5/11
Elevator motor kw	-	0.75	1.1	1.1	1.5	1.5	3	5.5
Compressed air (min 4 bar) l/min	40	40	40	40	40	40	40	40
Dim. A mm	350	600	741	920	1140	1200	1360	1800
B mm	870	1600	2020	2515	2860	2940	3295	3760
C mm	1210	1600	1750	2190	2515	2515	2870	2960
D mm	-	-	700	890	1000	1000	1000	1000
E mm	-	-	800	1020	1120	1120	1120	1120
Weight (kg)	180	580	930	1400	1750	1850	3000	3850

OPTION CHECK LIST

- * Vacuum or Gravity Loading Systems
- * Explosion Proof Protection
- * Stainless Steel Construction
- * Second Bowl
- * Jacketed Bowl
- * Vacuum Execution
- * Gralomatic End point detection
- * Variable Speed
- * Test Evaluation Facilities



Machines Collette have been building high quality equipment for the last 100 years. The success of the company is largely due to the continued research and development which has kept the company at the forefront of equipment suppliers worldwide. In order that you, the customer, can evaluate the exact equipment you require, we are able to offer you the possibility to test products in one of our laboratories in either Belgium or the USA. Both facilities contain a complete range of production equipment from a small planetary mixer up to a 300 litre VACTRON microwave system.

Each laboratory has full analytical equipment, compression machines and small-scale drying, in fact everything which you would require to have complete confidence in the results.

Next to our research programme, feasibility studies, development and pilot scale can be carried out by us for a full formal report - Also full in-house training can be given to your process staff in preparation for installation of your own production unit prior to delivery.

Apart from our test facilities, there is also the possibility of renting mixing, granulating and drying equipment for testing at your own company.

To add to your confidence in Collette, we have a complete technical staff to keep in touch with you, to offer advice and service so that your company and staff get the best results from equipment supplied by us.

For bookings in our laboratory, information about rental equipment - contact MACHINES COLLETTE, the experts in Pharmaceutical Technology and Process Equipment

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MACHINES

collette